U.S. DEPARTMENT OF ENERGY | Office of Indian Energy

Tribal Energy Development: Technical Assistance, Training, and Tools

U.S. DEPARTMENT OF ENERGY | Office of Indian Energy

Tribal Energy Development: Technical Assistance, Training, and Tools

Agenda

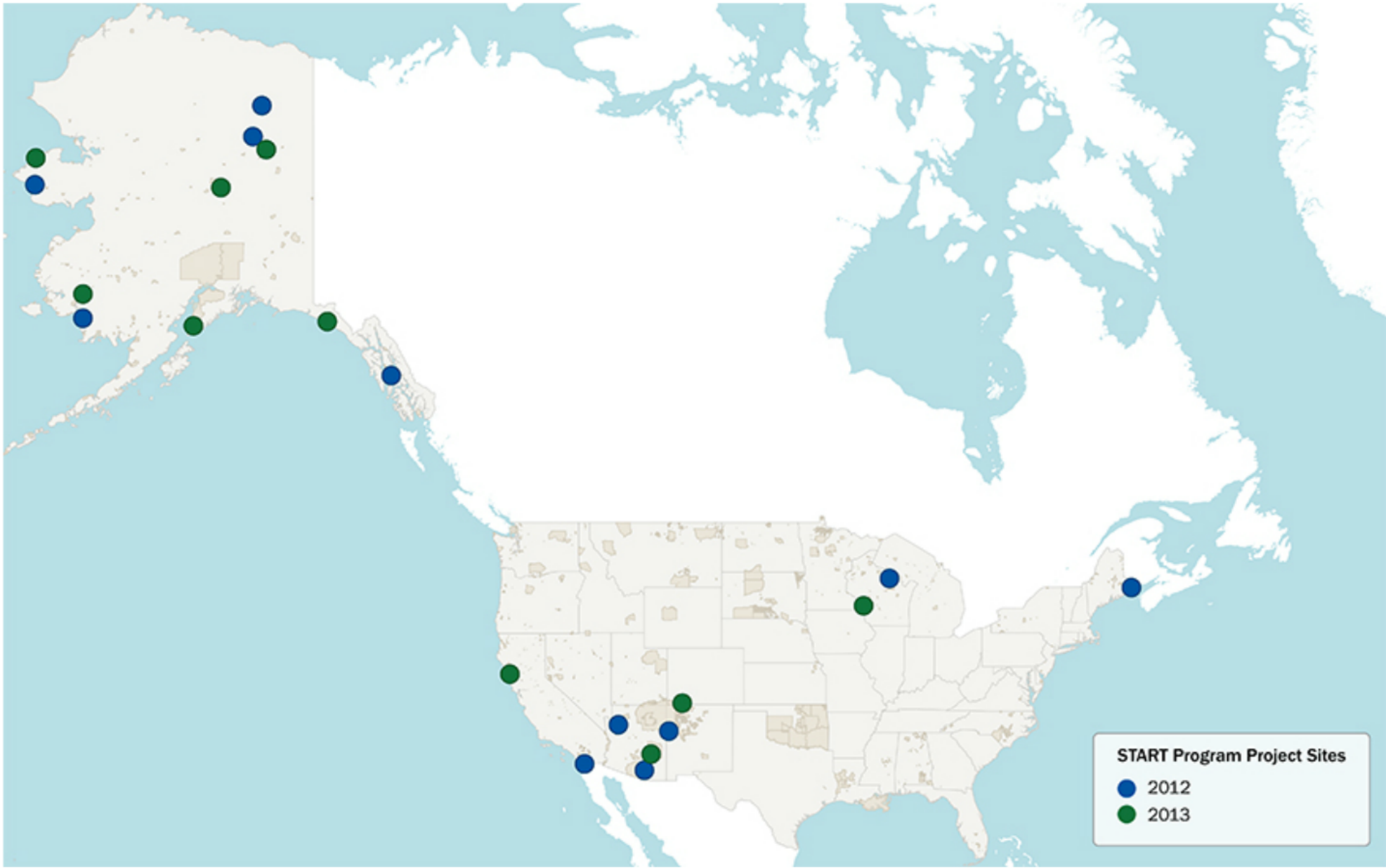
- Technical Assistance
- Capacity Building
- Analysis
- Tools
- Information Resources


Technical Assistance

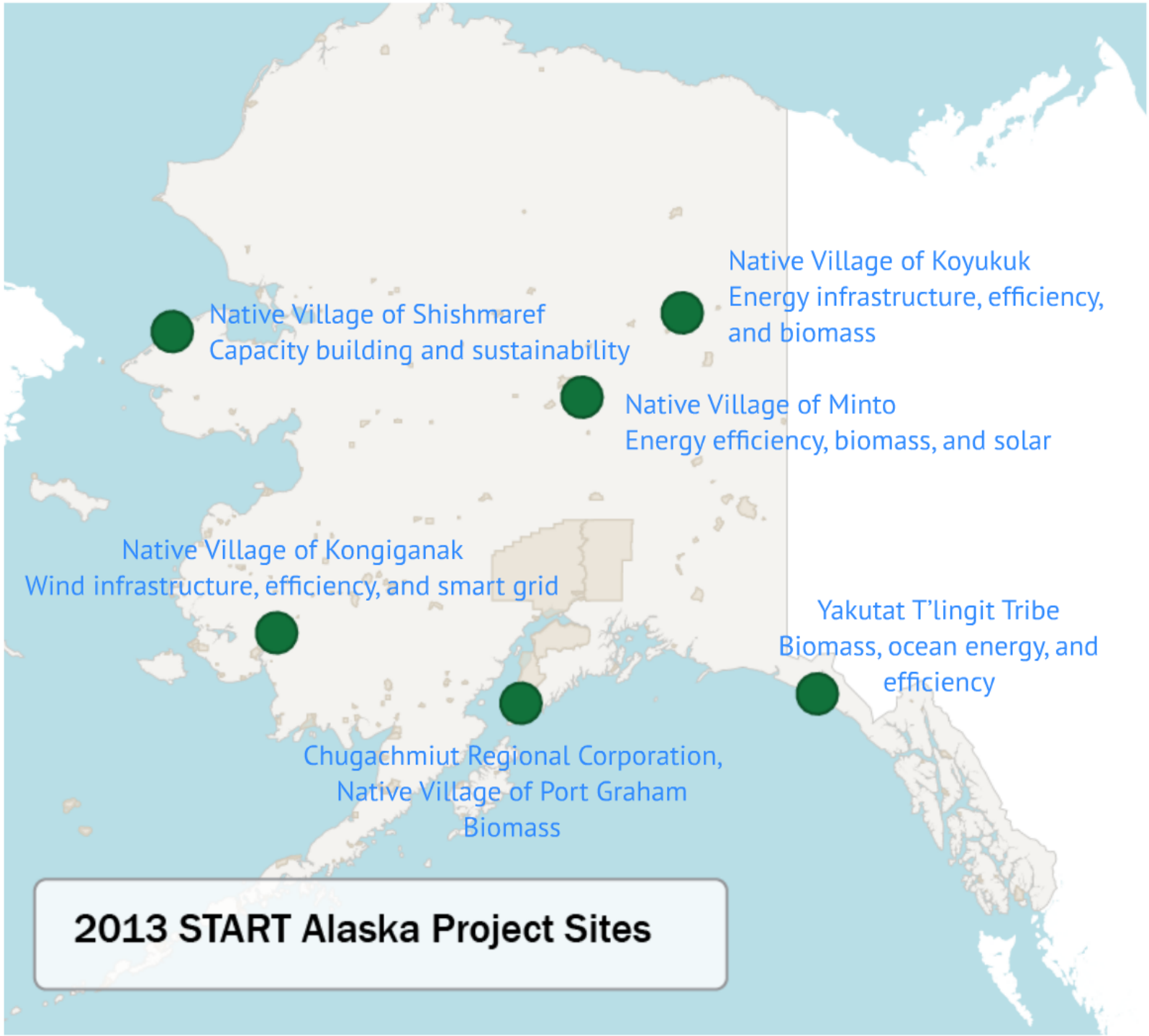
Strategic Technical Assistance Response Team (START) Program

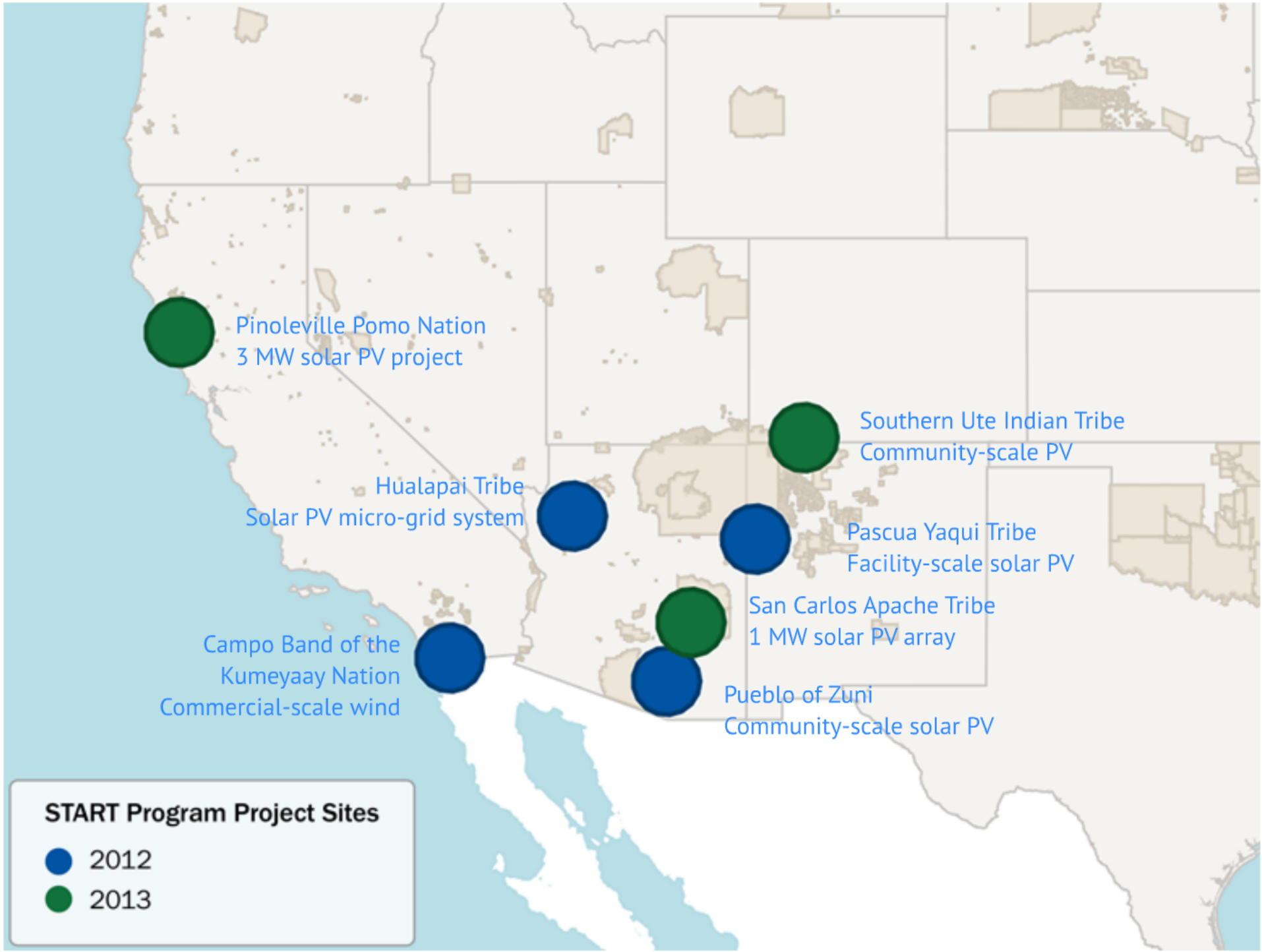
2012-2013 Projects

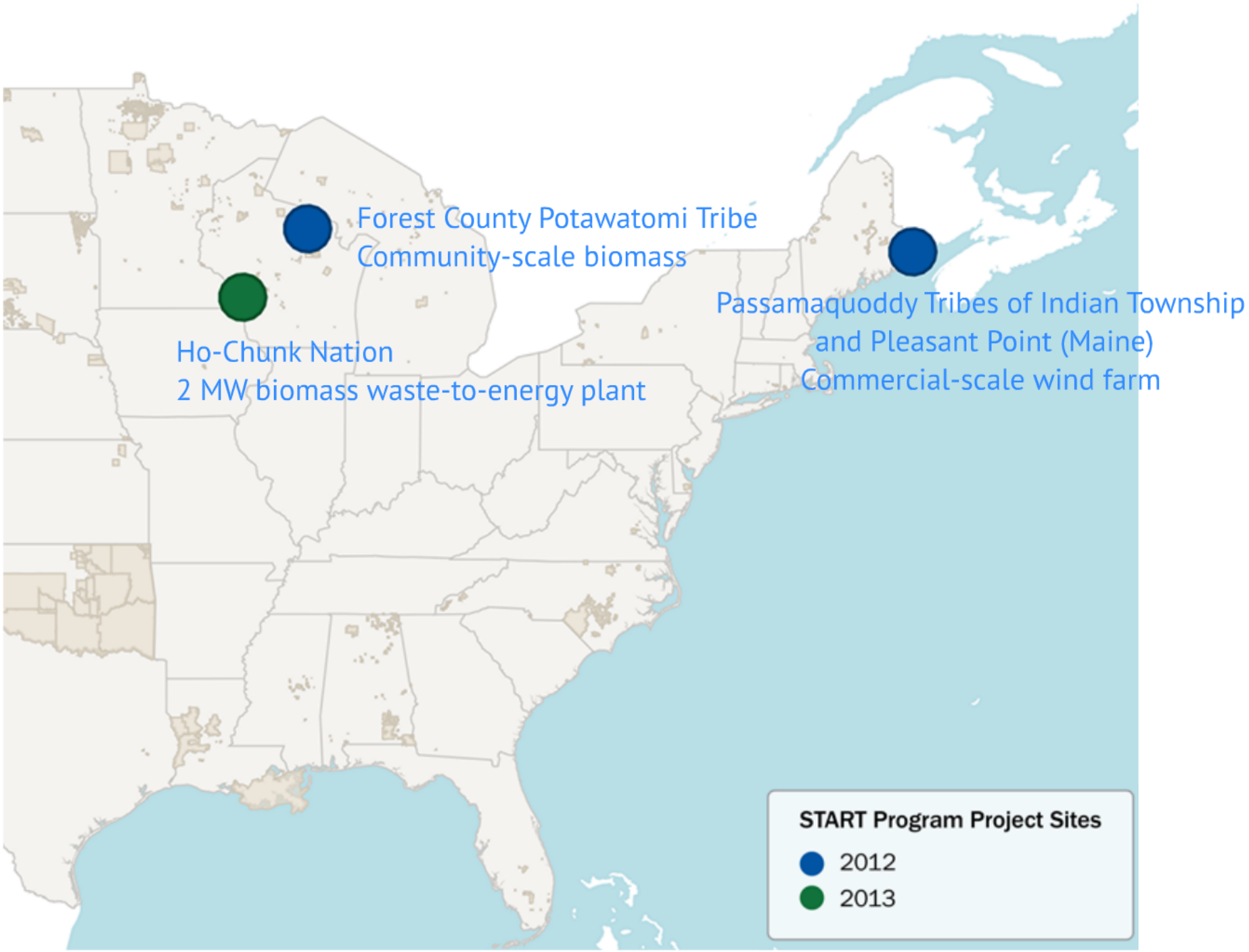
- 11 projects in 2012
- 10 projects in 2013


START Program Project Sites
2012
2013


Arctic Village Council & Venetie Village Council
Power Cost Equalization (PCE)
Native Village of Teller
Fuel transfer
Native Village of Kwinhagak
Waste-to-energy
Organized Village of Kake
Wind met tower move, biomass project
support, strategic energy planning
2012 START Alaska Project Sites

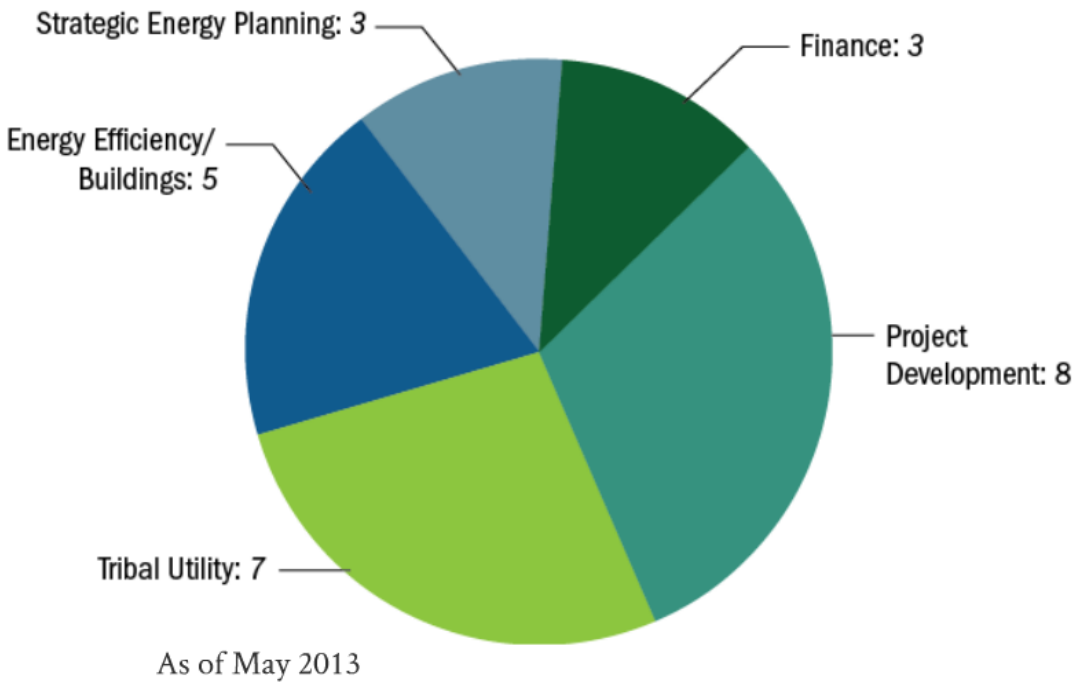

Native Village of Koyukuk
Energy infrastructure, efficiency, and biomass
Native Village of Shishmaref
Capacity building and sustainability
Native Village of Minto
Energy efficiency, biomass, and solar
Native Village of Kongiganak
Wind infrastructure, efficiency, and smart grid
Yakutat T'lingit Tribe
Biomass, ocean energy, and efficiency
Chugachmiut Regional Corporation,
Native Village of Port Graham
Biomass
2013 START Alaska Project Sites


Pinoleville Pomo Nation
3 MW solar PV project
Southern Ute Indian Tribe
Community-scale PV
Hualapai Tribe
Solar PV micro-grid system
Pascua Yaqui Tribe
Facility-scale solar PV
San Carlos Apache Tribe
1 MW solar PV array
Campo Band of the
Kumeyaay Nation
Commercial-scale wind
Pueblo of Zuni
Community-scale solar PV
START Program Project Sites
2012
2013


Forest County Potawatomi Tribe
Community-scale biomass
Ho-Chunk Nation
2 MW biomass waste-to-energy plant
Passamaquoddy Tribes of Indian Township
and Pleasant Point (Maine)
Commercial-scale wind farm
START Program Project Sites
2012
2013

On-Demand Technical Assistance

Technical Assistance – By Topic October 2012-May 2013



As of May 2013

- Tribes can apply for up to 40 hours of free assistance
- 50 Tribes received assistance through October 2013

Strategic Energy Planning

"I've done a lot of planning, and this one seemed to fit better than any other one. I feel very positive about how well it worked to connect people."

Elizabeth Neptune,
Passamaquoddy Tribe of
Indian Township


Capacity Building

Tribal Leader Education Programs

- 9 Foundational Courses - Renewable energy basics, strategic energy planning, electricity grid
- 7 Advanced Courses - Renewable energy project development and financing processes, structures, and project-scale walk-throughs

"Excellent introduction to basics of solar technology and resources for implementation. Concise, thorough, and well-paced."

J. Trgovcich

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Energy Industry Fundamentals
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weatherization-nwtp.nterlearning.org

Mechanical Insulation Education & Awareness E-Learning Series
★★★★★
nwtp.nterlearning.org

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★★★★☆
nwtp.nterlearning.org

(WX/OT) Weatherization Installer Course
★★★★☆
weatherization-nwtp.nterlearning.org

(WX/OT) Weatherization Crew Chief Course
★★★☆☆
weatherization-nwtp.nterlearning.org

More Featured Courses

New Courses

Hydrogen Safety for First Responders
☆☆☆☆☆
nwtp.nterlearning.org

DOE-IE Renewable Energy Curriculum
★★★★☆
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Bellevue College Health Information Technology Training Programs
☆☆☆☆☆

Photovoltaic Online Training For Code Officials:FREE COURSE
★★★☆☆

NTER Mobile
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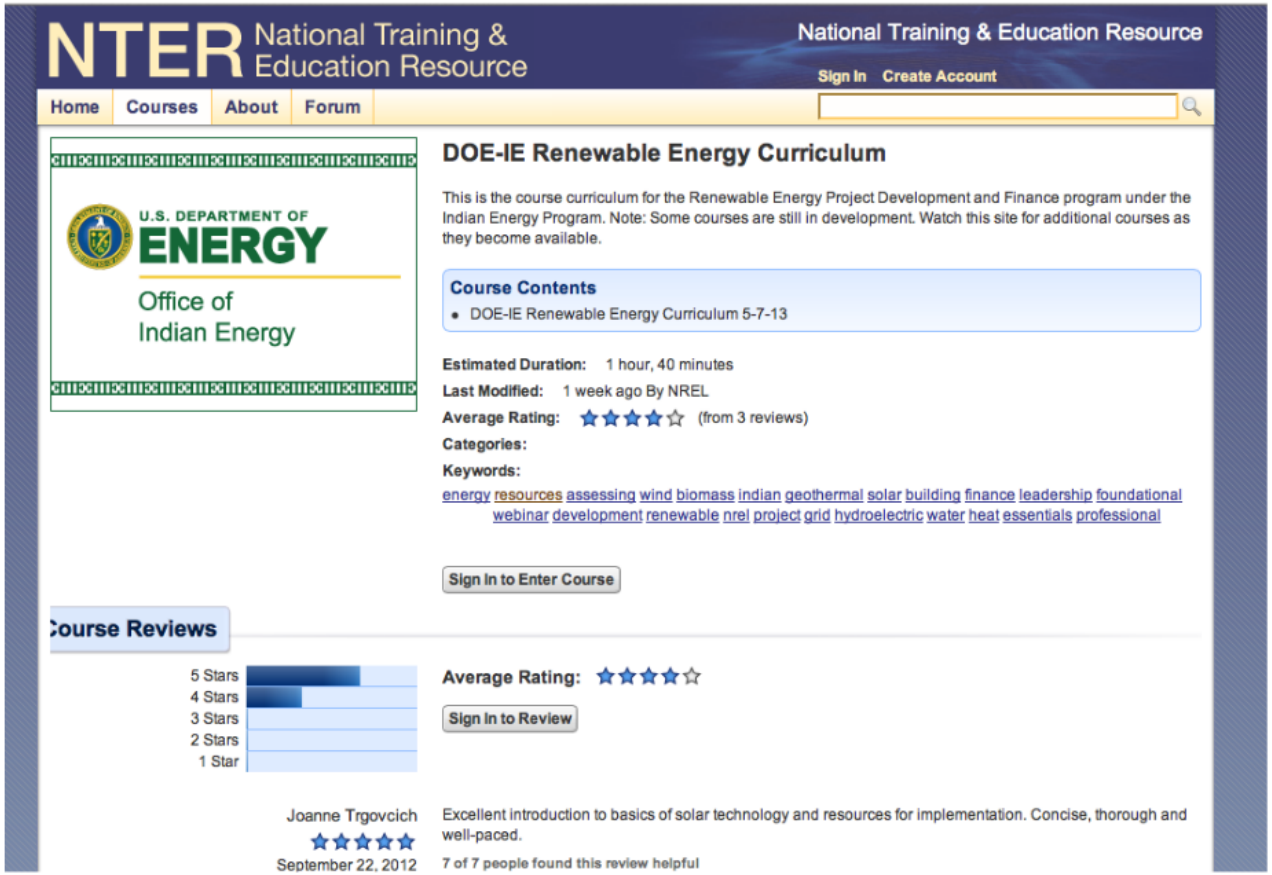
nwtp.nterlearning.org

Energy Industry Fundamentals
★★★★☆
weatherization-nwtp.nterlearning.org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National Training & Education Resource
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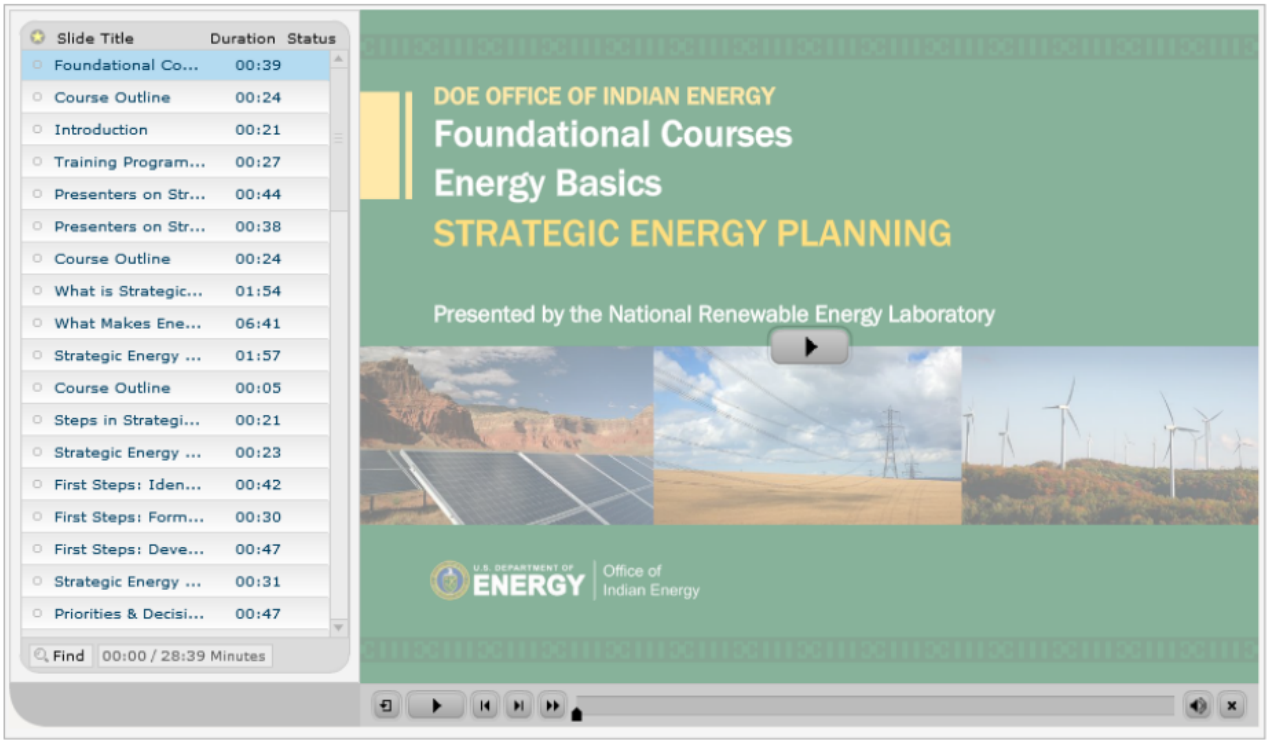
U.S. DEPARTMENT OF ENERGY
Office of Indian Energy
DOE-IE Renewable Energy Curriculum
This is the course curriculum for the Renewable Energy Project Development and Finance program under the Indian Energy Program. Note: Some courses are still in development. Watch this site for additional courses as they become available.
Course Contents
DOE-IE Renewable Energy Curriculum 5-7-13
Estimated Duration: 1 hour, 40 minutes
Last Modified: 1 week ago By NREL
Average Rating: (from 3 reviews)
Categories:
Keywords:
energy resources assessing wind biomass indian geothermal solar building finance leadership foundational webinar development renewable nrel project grid hydroelectric water heat essentials professional
Sign In to Enter Course
Course Reviews
5 Stars
4 Stars
3 Stars
2 Stars
1 Star
Average Rating:
Sign In to Review
Joanne Trgovcich
September 22, 2012
Excellent introduction to basics of solar technology and resources for implementation. Concise, thorough and well-paced.
7 of 7 people found this review helpful

Strategic Energy Planning - Webinar

U.S. DEPARTMENT OF ENERGY | Office of Indian Energy

RENEWABLE ENERGY CURRICULUM

Webinar Player



Webinar Slides

DOE-IE_Foundational_Strategic_Energy_Planning.pdf (2.35 MB)

Audio Text Version

DOE-IE_Foundational_Strategic_Energy_Planning_textversion.pdf (158.62 KB)

Tribal Renewable Energy Project Development and Finance In-Person Workshops

- Commercial-Scale Development
  July 9-11, Denver, Colorado
- Community- and Facility-Scale Development
  September 16-20, Denver, Colorado

More in 2014!

Tribal Leader and Best Practices Forums

- 6 forums held to date
- More than 300 participants
- Opportunity for networking/partnerships

Tribal Renewable Energy Webinar Series

- FY13 Focus on commercial-scale projects and working with utilities
- FY14 Focus on community-scale
- Free, monthly webinars offered through October 2014
- Nearly 2,000 attendees to date

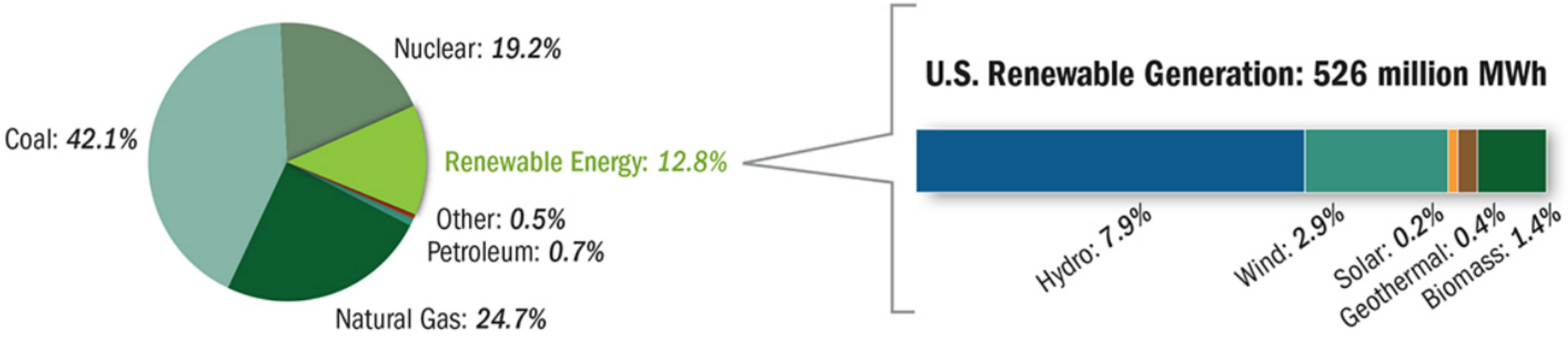

Analysis

Renewable Energy Technical Potential on Tribal Lands

Key Findings:

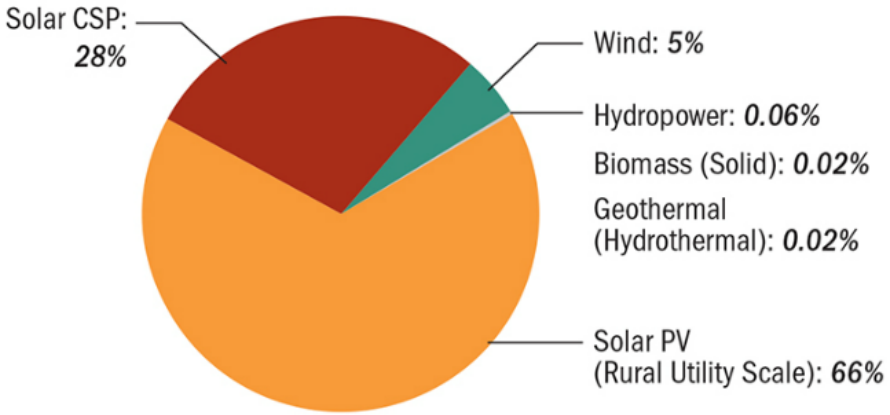
- 14 billion MWh of solar, or 5.1% of total U.S. generation potential
- 1,100 million MWh of wind, or about 3.4% of the total U.S. technical potential
- 7 million MWh of hydropower, or about 2.9% of the total U.S. technical potential

U.S. Electric Net Generation (2011): 4,117 million MWh



Megawatt-hour (MWh) of Tribal Generation[3] Potential[2]

Total[4] = 21,631,785,869



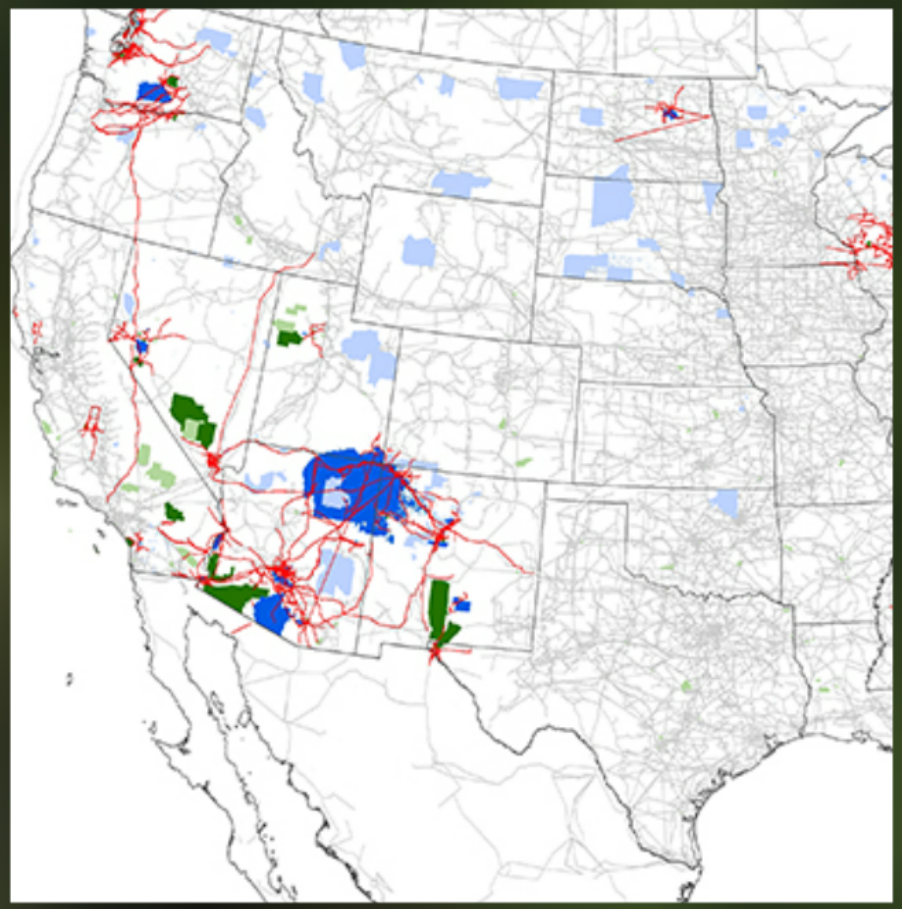
American Indian land comprises 2% of U.S. land, but contains an estimated 5% of all renewable energy resources

Financing Opportunities for Renewable Energy Development in Alaska

Key Findings:

- Innovative financing structures often required to fully realize available tax benefits
- Typically includes a combination of government-sponsored and private funding
- Factors to consider when selecting the optimal financing structure include: tax status, source of capital, project terms, and ownership interest

Military Base Off-taker Opportunities for Tribal Renewable Energy Projects



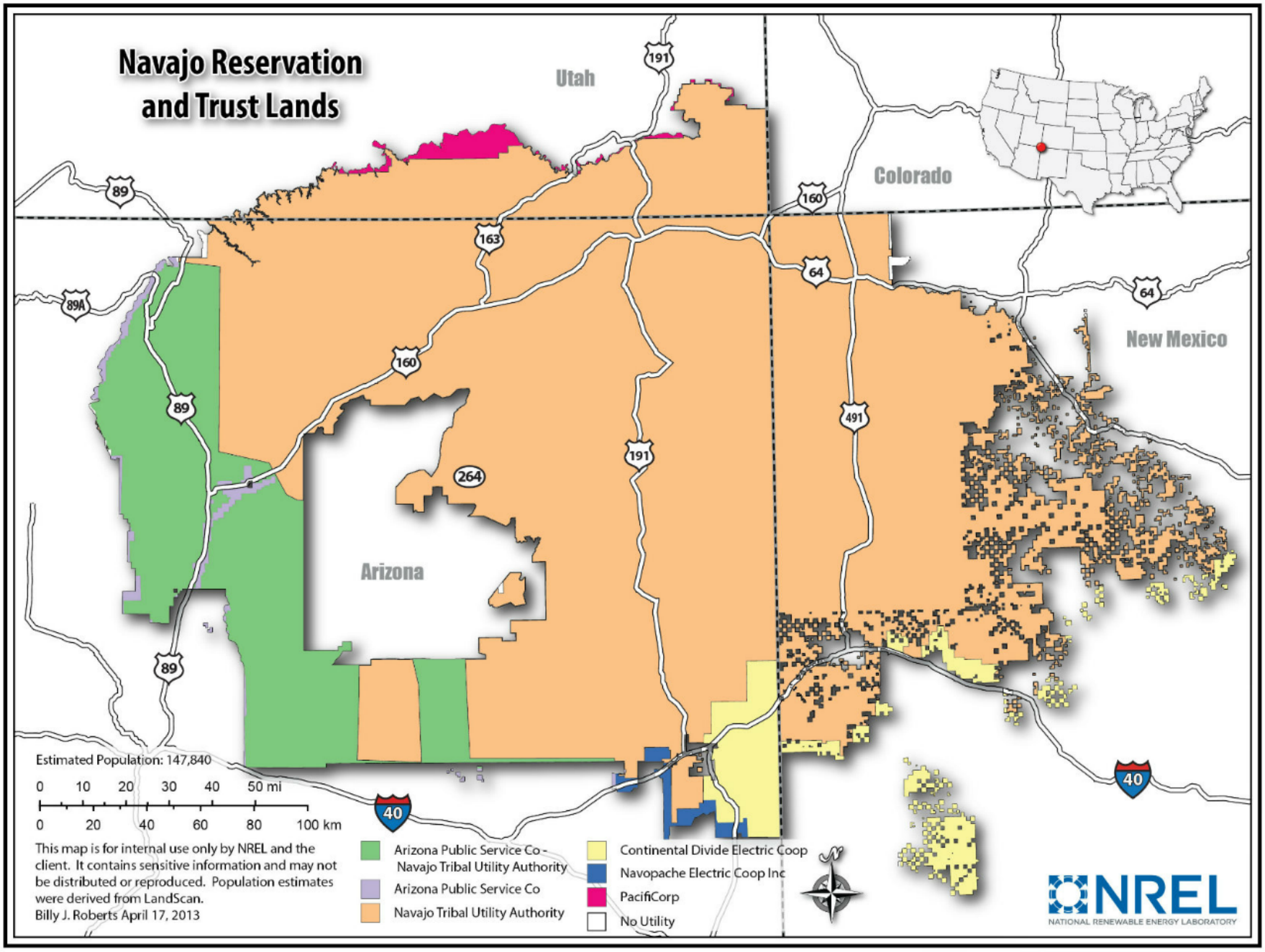
Key Findings:

- There are 53 reservations located within 10 miles of military bases
- Top 15 reservations with tribal installation energy potential identified
- Benefits to Tribes may include additional income from land leases, energy sales, and workforce development

Electrification Study: Tribal Energy Information Update (Forthcoming)

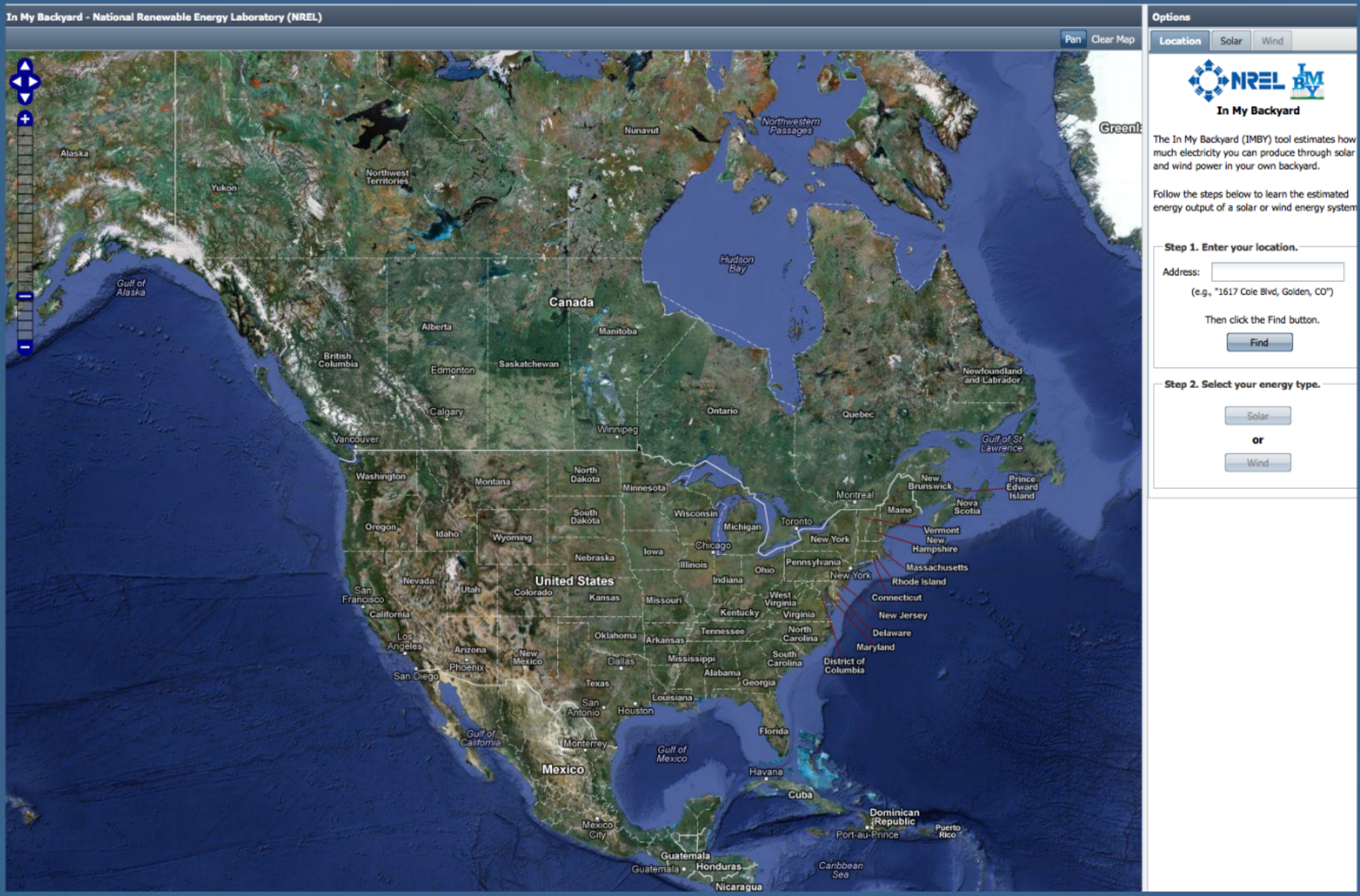
Purpose and Goals:

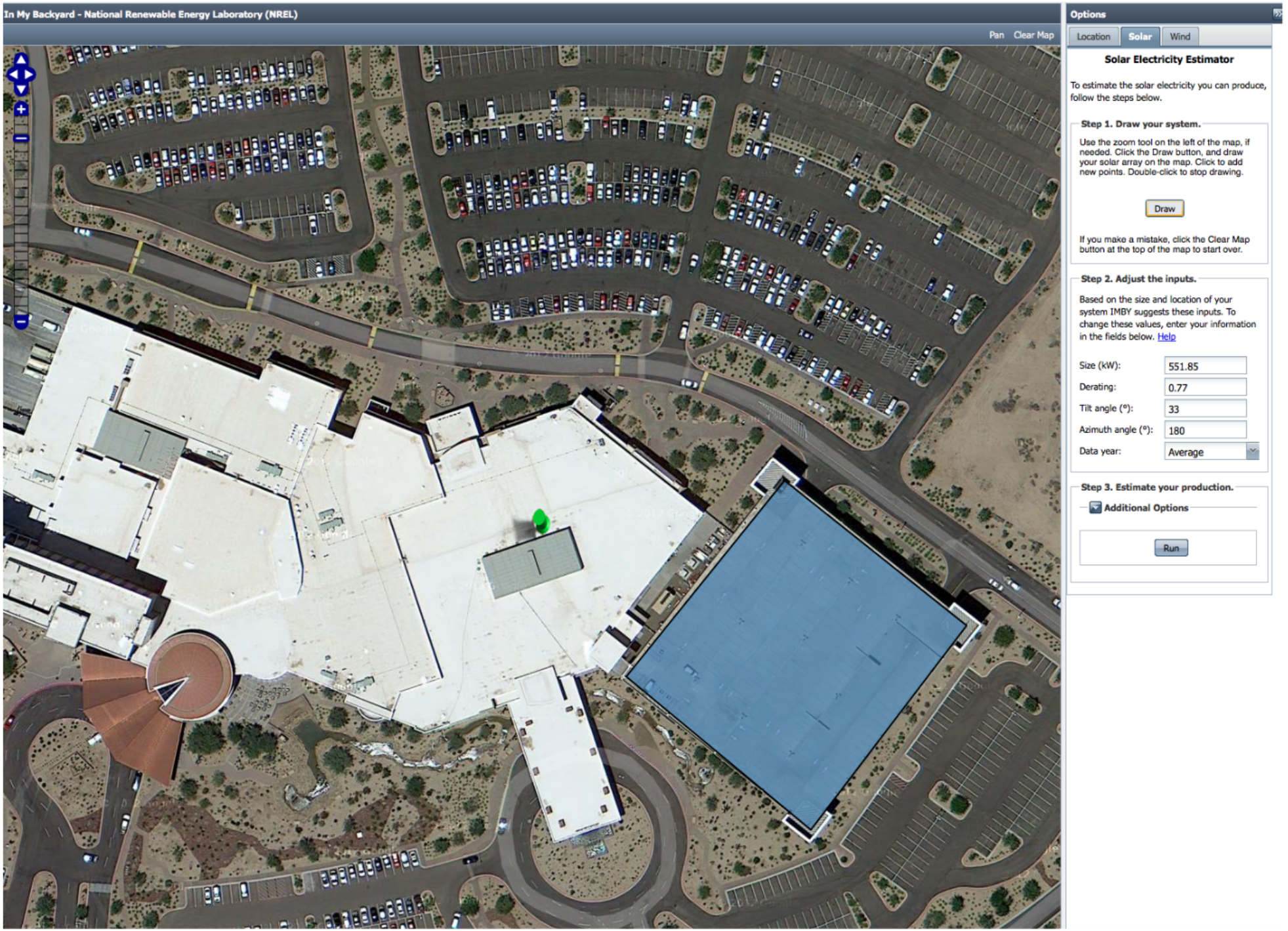
- Compare top five Indian Reservations in the following categories:
  - Households without electricity in 1990 vs. 2000
  - Reservations with highest residential electricity prices in 1998 vs. 2000
- Provide better understanding of electrification rates, energy consumption, energy costs, and energy reliability issues on tribal lands
- Present necessary and updated information to advance development of tribal community-scale energy systems and utilities

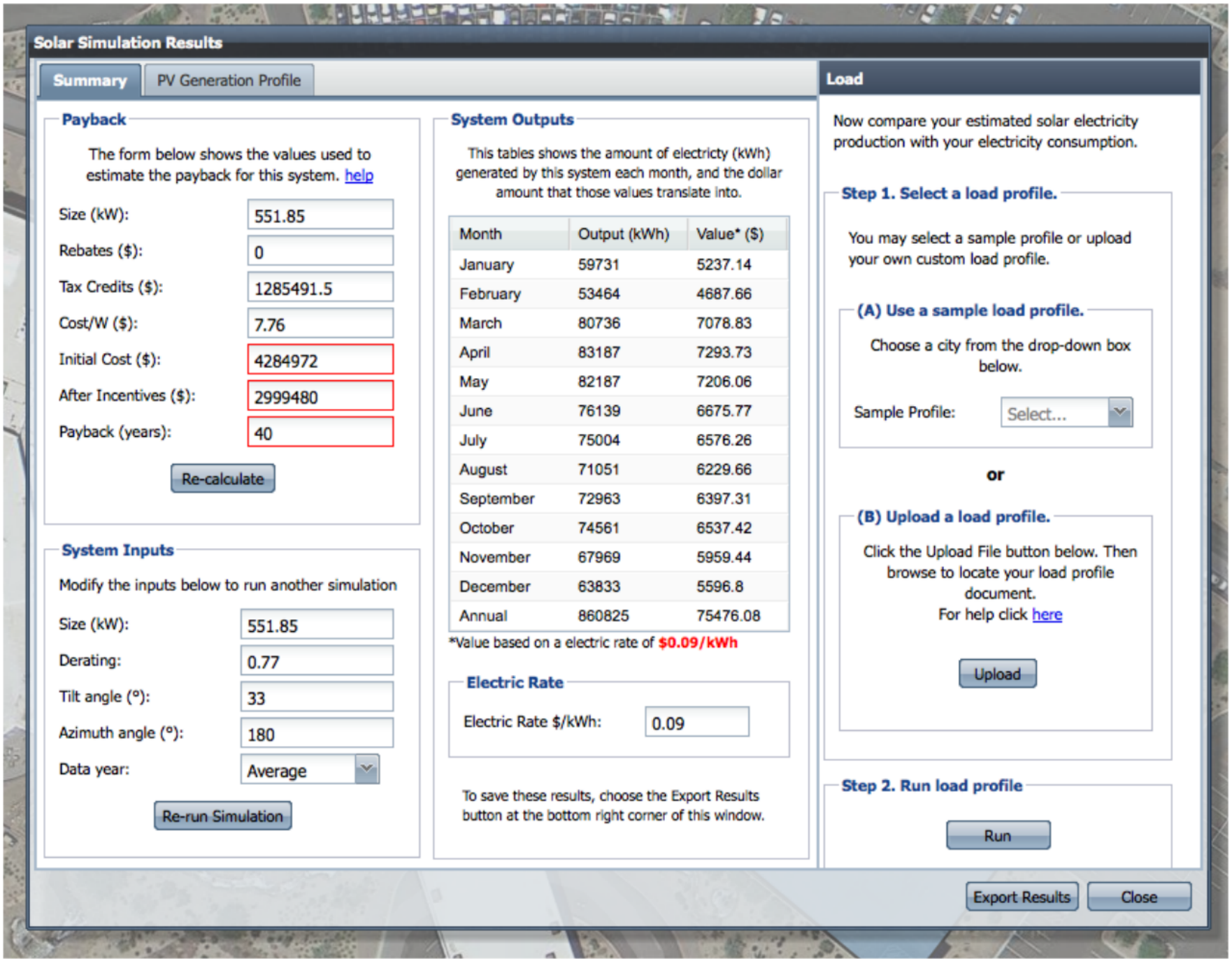

Navajo Reservation and Trust Lands
Utah
Colorado
New Mexico
Arizona
191
89
89A
160
163
64
491
264
40
Estimated Population: 147,840
0 10 20 30 40 50 mi
0 20 40 60 80 100 km
This map is for internal use only by NREL and the client. It contains sensitive information and may not be distributed or reproduced. Population estimates were derived from LandScan.
Billy J. Roberts April 17, 2013
Arizona Public Service Co - Navajo Tribal Utility Authority
Arizona Public Service Co
Navajo Tribal Utility Authority
Continental Divide Electric Coop
Navopache Electric Coop Inc
PacifiCorp
No Utility
N
NREL
NATIONAL RENEWABLE ENERGY LABORATORY

Tools

In My Backyard



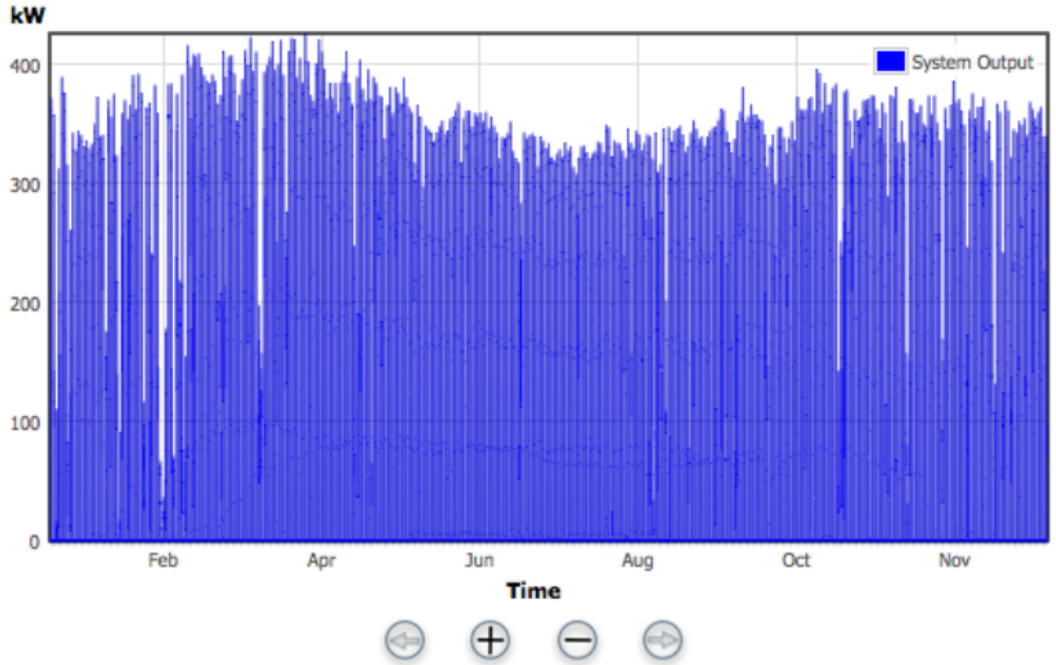

In My Backyard - National Renewable Energy Laboratory (NREL)
Pan
Clear Map
Options
Location
Solar
Wind
Solar Electricity Estimator
To estimate the solar electricity you can produce, follow the steps below.
Step 1. Draw your system.
Use the zoom tool on the left of the map, if needed. Click the Draw button, and draw your solar array on the map. Click to add new points. Double-click to stop drawing.
Draw
If you make a mistake, click the Clear Map button at the top of the map to start over.
Step 2. Adjust the inputs.
Based on the size and location of your system IMBY suggests these inputs. To change these values, enter your information in the fields below. Help
Size (kW): 551.85
Derating: 0.77
Tilt angle (°): 33
Azimuth angle (°): 180
Data year: Average
Step 3. Estimate your production.
Additional Options
Run


Solar Simulation Results
Summary
PV Generation Profile
Payback
The form below shows the values used to estimate the payback for this system. help
Size (kW): 551.85
Rebates ($): 0
Tax Credits ($): 1285491.5
Cost/W ($): 7.76
Initial Cost ($): 4284972
After Incentives ($): 2999480
Payback (years): 40
Re-calculate
System Inputs
Modify the inputs below to run another simulation
Size (kW): 551.85
Derating: 0.77
Tilt angle (°): 33
Azimuth angle (°): 180
Data year: Average
Re-run Simulation
System Outputs
This tables shows the amount of electricty (kWh) generated by this system each month, and the dollar amount that those values translate into.
Month | Output (kWh) | Value* ($)
January | 59731 | 5237.14
February | 53464 | 4687.66
March | 80736 | 7078.83
April | 83187 | 7293.73
May | 82187 | 7206.06
June | 76139 | 6675.77
July | 75004 | 6576.26
August | 71051 | 6229.66
September | 72963 | 6397.31
October | 74561 | 6537.42
November | 67969 | 5959.44
December | 63833 | 5596.8
Annual | 860825 | 75476.08
*Value based on a electric rate of $0.09/kWh
Electric Rate
Electric Rate $/kWh: 0.09
To save these results, choose the Export Results button at the bottom right corner of this window.
Load
Now compare your estimated solar electricity production with your electricity consumption.
Step 1. Select a load profile.
You may select a sample profile or upload your own custom load profile.
(A) Use a sample load profile.
Choose a city from the drop-down box below.
Sample Profile: Select...
or
(B) Upload a load profile.
Click the Upload File button below. Then browse to locate your load profile document.
For help click here
Upload
Step 2. Run load profile
Run
Export Results
Close

Solar Simulation Results

Summary | **PV Generation Profile**

Hourly PV Simulation Profile



Help...

Your estimated solar photovoltaic (PV) system production is shown in the chart above.

To zoom in on any part of the chart, click and drag over your area of interest. To move the chart data use the controls at the bottom of the graph window.

Load

Now compare your estimated solar electricity production with your electricity consumption.

Step 1. Select a load profile.

You may select a sample profile or upload your own custom load profile.

(A) Use a sample load profile.

Choose a city from the drop-down box below.

Sample Profile: Select...

or

(B) Upload a load profile.

Click the Upload File button below. Then browse to locate your load profile document.
For help click here

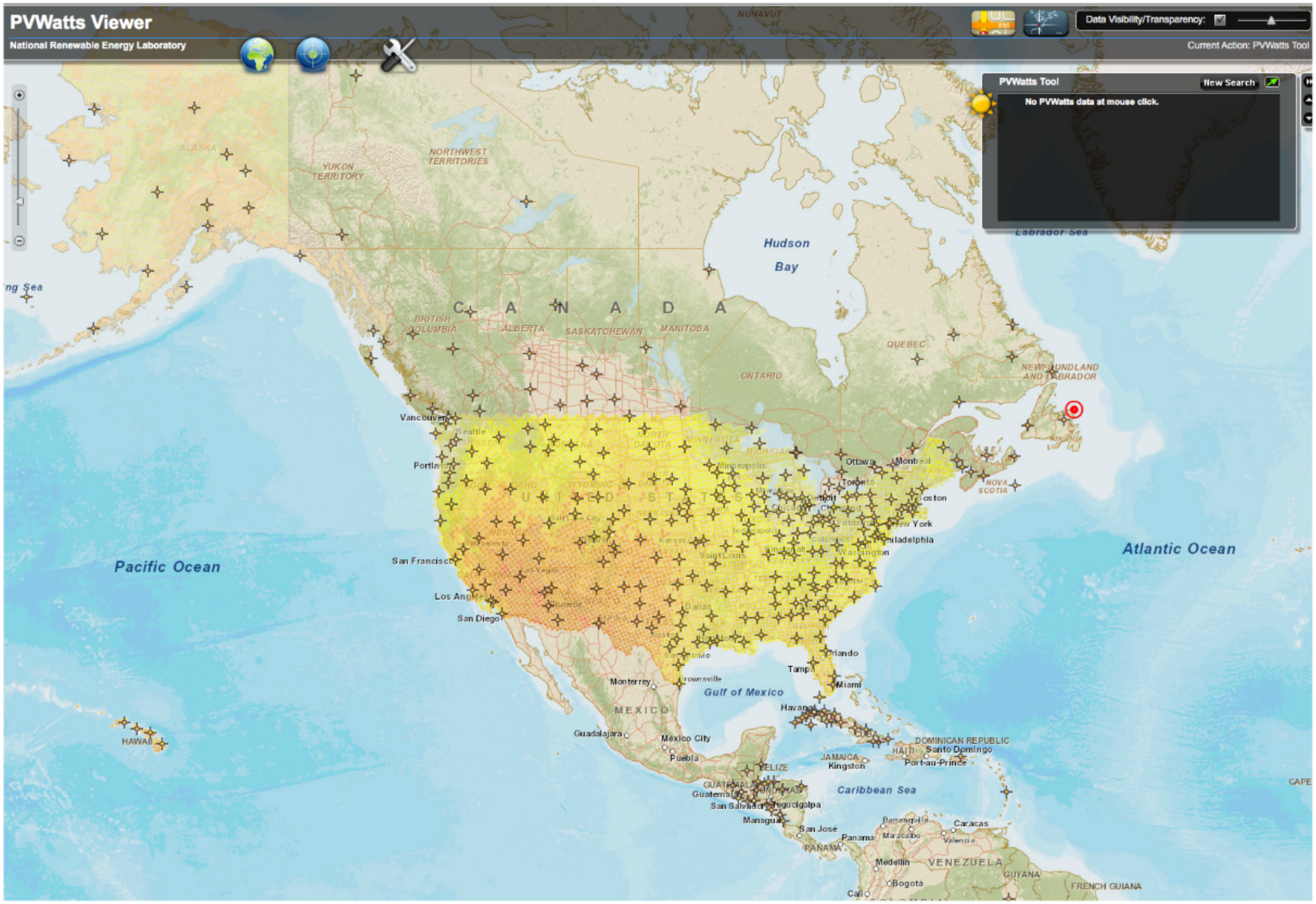
Upload

Step 2. Run load profile

Run

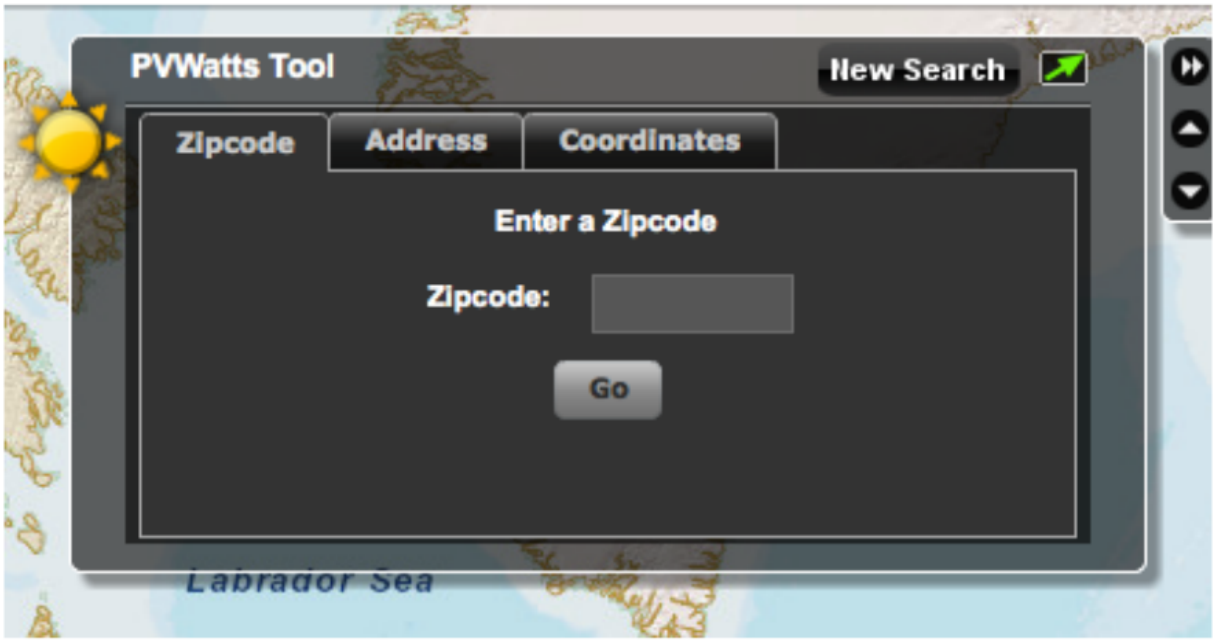
Export Results | Close

PV Watts



PVWatts Viewer
National Renewable Energy Laboratory
Data Visibility/Transparency:
Current Action: PVWatts Tool
PVWatts Tool
New Search
No PVWatts data at mouse click.
Hudson
Bay
C A N A D A
Pacific Ocean
Atlantic Ocean
Gulf of Mexico
Caribbean Sea
MEXICO

Enter a Zip Code:



PVWatts

Click on **Calculate** if default values are acceptable, or after selecting your system specifications. Click on **Help** for information about system specifications. To use a DC to AC derate factor other than the default, click on **Derate Factor Help** for information.

SITE LOCATION:

WBAN NUMBER:	94018
CITY:	Boulder
STATE:	Colorado
LATITUDE:	40.02°N
LONGITUDE:	105.25°W
ELEVATION:	1634 m

PV SYSTEM SPECIFICATIONS:

DC RATING (KW):	4.0	
DC TO AC DERATE FACTOR:	0.77	DERATE FACTOR HELP
ARRAY TYPE:	Fixed Tilt	

FIXED TILT OR 1-AXIS TRACKING SYSTEM:

ARRAY TILT (DEGREES):	40.02	(Default = Latitude)
ARRAY AZIMUTH (DEGREES):	180	(Default = Equator-Facing)

ENERGY DATA:

CENTS PER KWH:		(Default = State Average)

Calculate HELP Reset Form

PVWatts

AC Energy & Cost Savings

Cautions for Interpreting the Results

(Type comments here to appear on printout; maximum 1 row of 80 characters.)

Station Identification	
City:	Boulder
State:	Colorado
Latitude:	40.02° N
Longitude:	105.25° W
Elevation:	1634 m
PV System Specifications	
DC Rating:	4.0 kW
DC to AC Derate Factor:	0.770
AC Rating:	3.1 kW
Array Type:	Fixed Tilt
Array Tilt:	40.0°
Array Azimuth:	180.0°
Energy Specifications	
Cost of Electricity:	8.4 ¢/kWh

Results			
Month	Solar Radiation (kWh/m ^{2}/day)	AC Energy (kWh)	Energy Value ($)
1	4.43	427	35.87
2	4.89	418	35.11
3	6.05	564	47.38
4	6.09	529	44.44
5	5.99	523	43.93
6	6.08	501	42.08
7	6.06	502	42.17
8	6.24	518	43.51
9	6.25	516	43.34
10	5.67	503	42.25
11	4.60	420	35.28
12	4.29	413	34.69
Year	5.56	5834	490.06

Output Hourly Performance Data

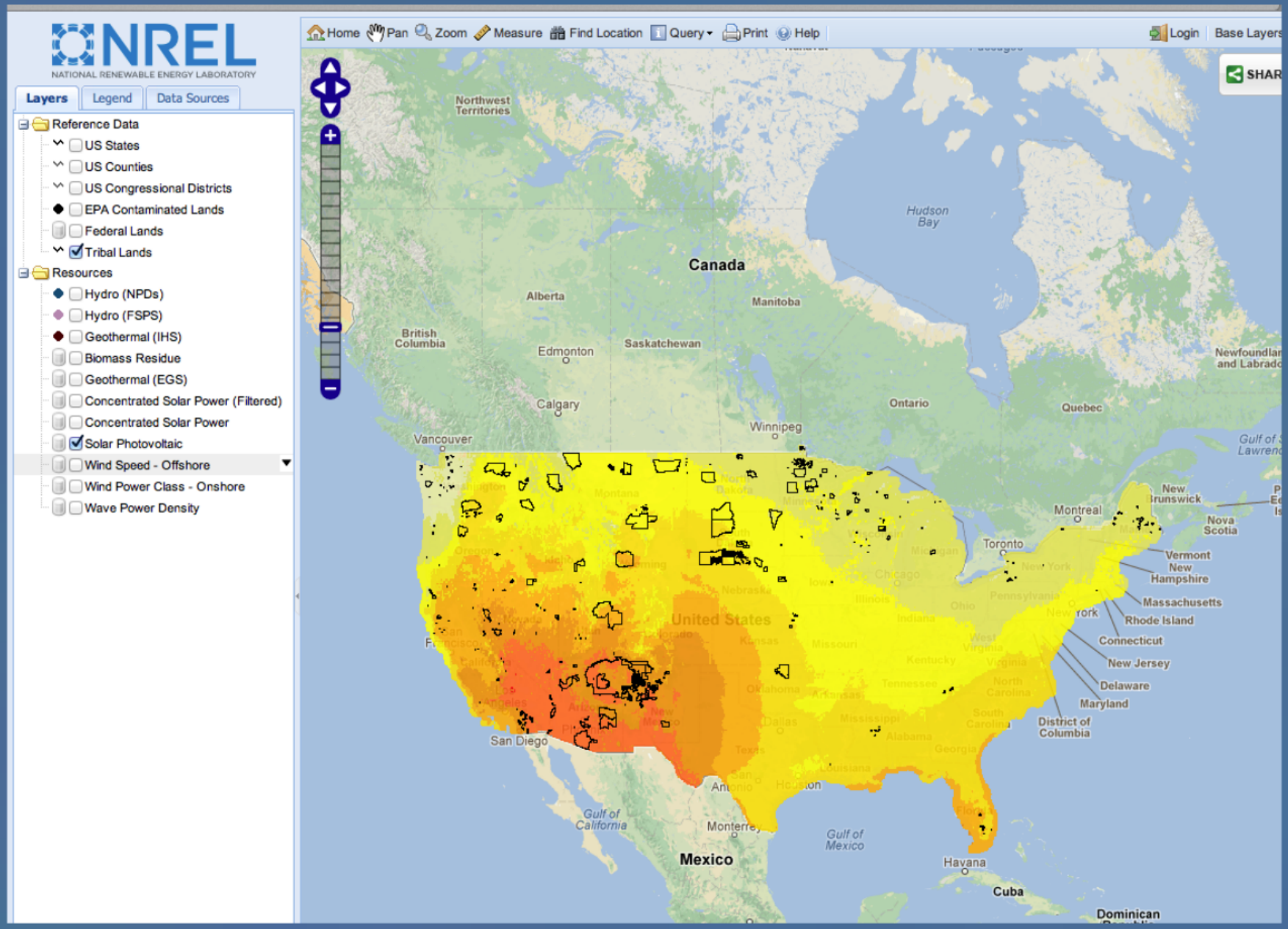
Output Results as Text

About the Hourly Performance Data

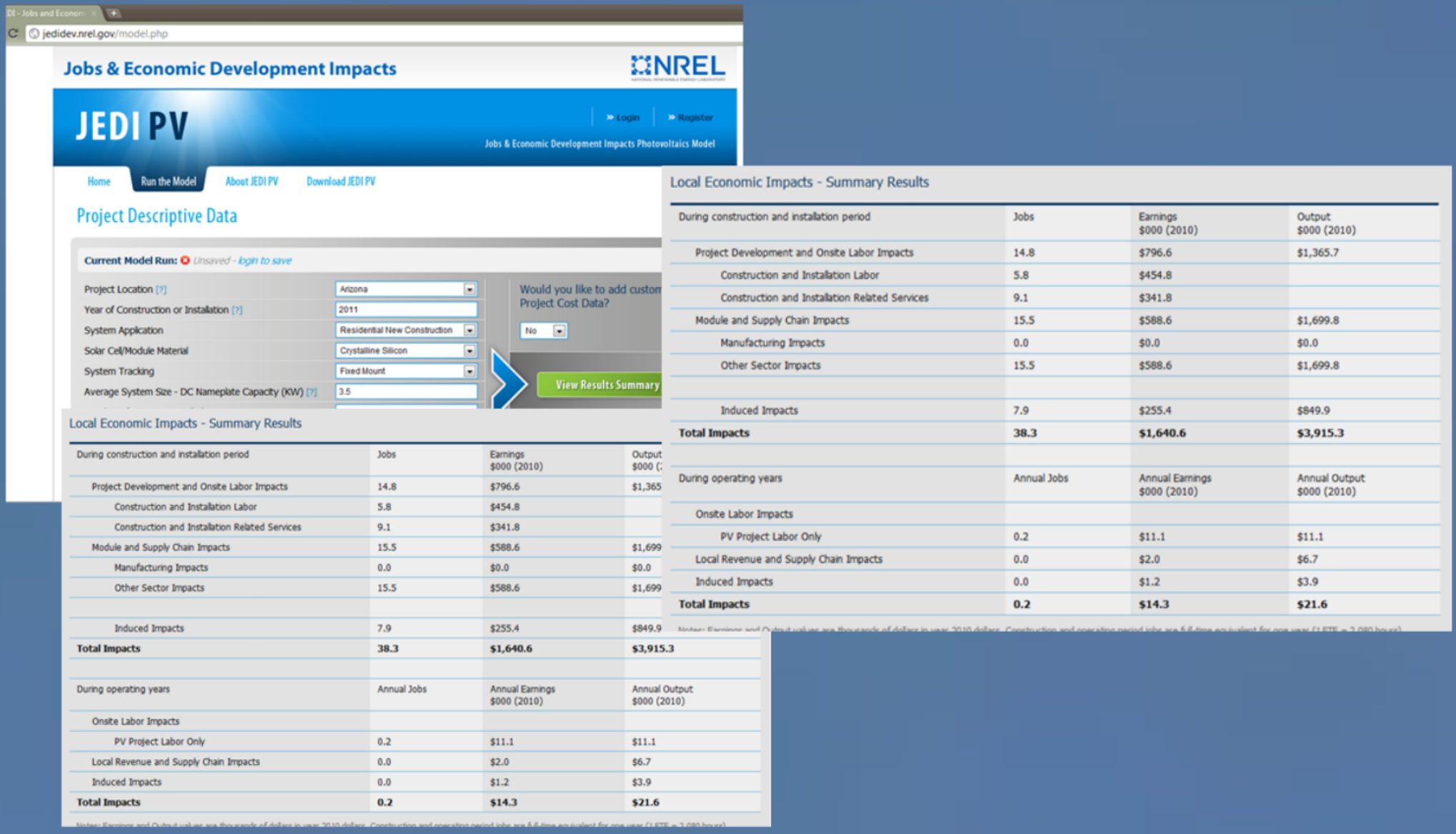
Saving Text from a Browser

Run PVWATTS v.1 for another US location or an International location
Run PVWATTS v.2 (US only)

RE Atlas


NREL
NATIONAL RENEWABLE ENERGY LABORATORY
Layers
Legend
Data Sources
Reference Data
US States
US Counties
US Congressional Districts
EPA Contaminated Lands
Federal Lands
Tribal Lands
Resources
Hydro (NPDs)
Hydro (FSPS)
Geothermal (IHS)
Biomass Residue
Geothermal (EGS)
Concentrated Solar Power (Filtered)
Concentrated Solar Power
Solar Photovoltaic
Wind Speed - Offshore
Wind Power Class - Onshore
Wave Power Density
Home
Pan
Zoom
Measure
Find Location
Query
Print
Help
Login
Base Layers
Canada
United States
Mexico
Hudson Bay
Northwest Territories
Alberta
Manitoba
Saskatchewan
British Columbia
Edmonton
Calgary
Winnipeg
Vancouver
Ontario
Quebec
Montreal
Toronto
New Brunswick
Nova Scotia
Vermont
New Hampshire
Massachusetts
Rhode Island
Connecticut
New Jersey
Delaware
Maryland
District of Columbia
San Diego
Gulf of California
Gulf of Mexico
Havana
Cuba

Jobs and Economic Development Impact (JEDI)



» Register

Photovoltaics Model

Local Economic Impacts - Summary Results

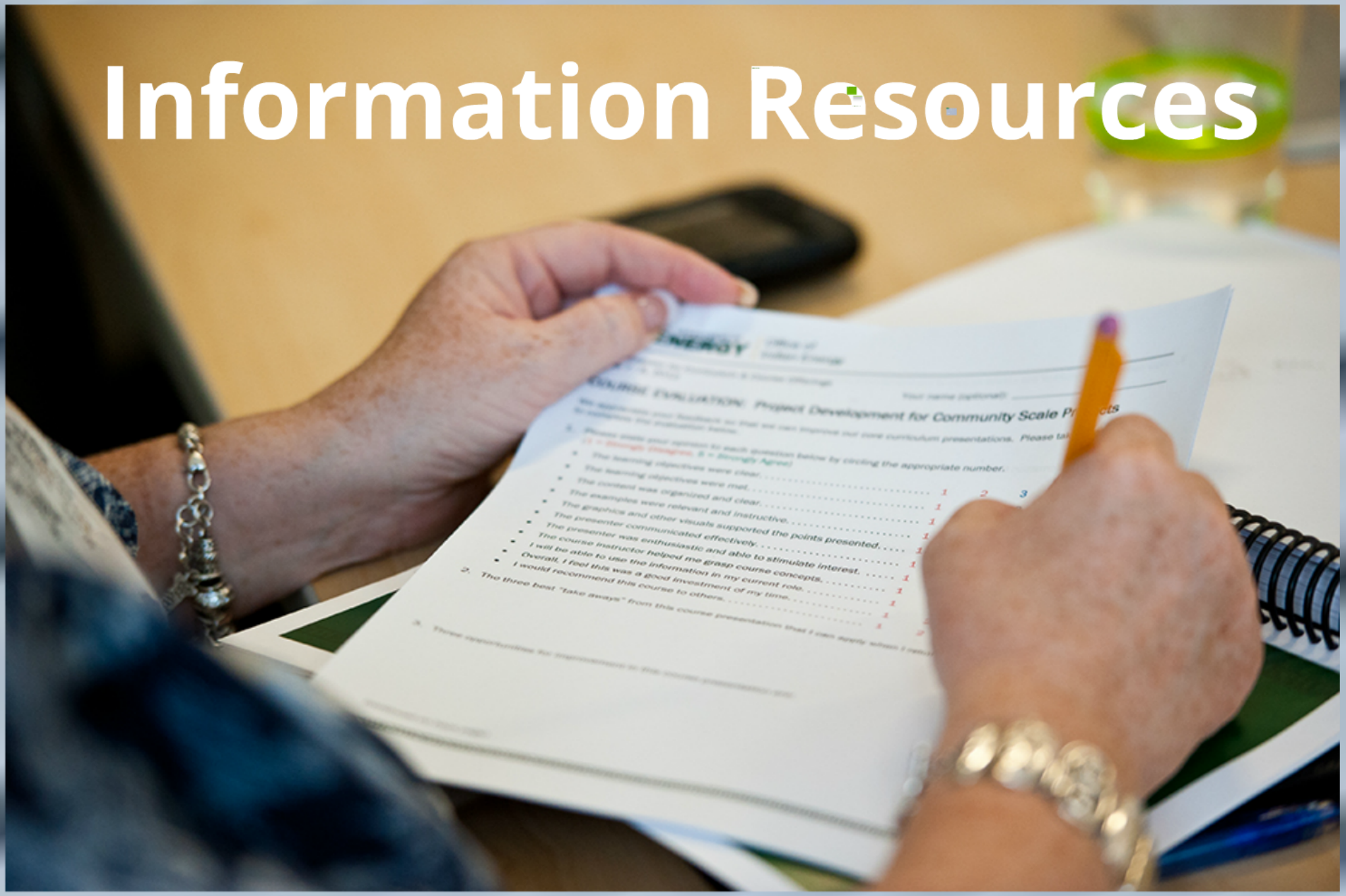
During construction and installation period	Jobs	Earnings $000 (2010)	Output $000 (2010)
Project Development and Onsite Labor Impacts	14.8	$796.6	$1,365.7
Construction and Installation Labor	5.8	$454.8	
Construction and Installation Related Services	9.1	$341.8	
Module and Supply Chain Impacts	15.5	$588.6	$1,699.8
Manufacturing Impacts	0.0	$0.0	$0.0
Other Sector Impacts	15.5	$588.6	$1,699.8
Induced Impacts	7.9	$255.4	$849.9
Total Impacts	**38.3**	**$1,640.6**	**$3,915.3**
During operating years	Annual Jobs	Annual Earnings $000 (2010)	Annual Output $000 (2010)
Onsite Labor Impacts			
PV Project Labor Only	0.2	$11.1	$11.1
Local Revenue and Supply Chain Impacts	0.0	$2.0	$6.7
Induced Impacts	0.0	$1.2	$3.9
Total Impacts	**0.2**	**$14.3**	**$21.6**

Notes: Earnings and Output values are thousands of dollars in year 2010 dollars. Construction and operating period jobs are full-time equivalent for one year (1 FTE = 2,080 hours).

Partners


National Association of Regulatory Utility Commissioners
Office of Electricity Delivery and Energy Reliability
Denali Commission
Cohn Reznick
Cold Climate Housing Research Center
American Council on Renewable Energy
Alaska Housing Finance Corporation
Environmental Protection Agency
Rural Alaska Community Action Program
U.S. Department of Interior
University of Alaska Anchorage
Renewable Energy Alaska Project
Alaska Center for Energy and Power
U.S. Forest Service
U.S. Coast Guard
National Renewable Energy Laboratory
U.S. Department of Agriculture
Red Mountain Energy Partners
Dearhouse Consulting Group
Sandia National Laboratories
Power Marketing Authorities
Kabotie Consulting
Alaska Energy Authority
Interstate Renewable Energy Council
University of Alaska Fairbanks

Information Resources



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NEWS

MAY 20, 2013

Energy Department Announces New Technical Assistance for Tribal Clean Energy Projects

The Energy Department announced that five Tribes will receive technical assistance through the Strategic Technical Assistance Response Team (START) Program for renewable energy project development and installation.

More News

BLOG

MAY 3, 2013

Helping Alaska Native Communities Reduce Their Energy Costs

Learn how the Energy Department is helping Alaska Native communities

POPULAR TOPICS

- Education and Training
- Energy Resource Library
- Indian Country Energy and Infrastructure Working Group
- START Program
- Technical Assistance
- Tribal Leader Energy Forums
- Contact Us

FEATURED LINKS

- Apply Now for Tribal Clean Energy Funding Opportunities
- USDA 2013 Rural Business Opportunity Grant Program
- Green Power Network
- Energy Department Policy on Acquiring Tribal Renewable Energy Products
- New Tribal Economic Development Bonds Guidance

UPCOMING EVENTS

Introduction to NABI and Asset Building in Native Communities Webinar
May 23, 2013
Regional Transmission Planning Webinar
May 29, 2013
Developing a Strong NABI Application Webinar
May 30, 2013
More Events

NEW RESOURCES

- Advancing Efforts to Energize Native Alaska
- Department of Defense Contracting Requirements for Energy Procurement Webinar
- Developing Tribal Energy Projects: Community Energy Planning
- Financing Opportunities for Renewable Energy Development in Alaska
- Military Base Off-Taker Opportunities for Tribal Renewable Energy Projects
- Office of Indian Energy Newsletter: Spring 2013

DEVELOPING CLEAN ENERGY PROJECTS ON TRIBAL LANDS

ENERGY RESOURCE LIBRARY

Education and Training
Energy Resource Library
Funding Opportunities
Newsletter
Roundtables
START Program
Technical Assistance
Tribal Energy Program
Tribal Summit

FEATURED PUBLICATIONS

A Guide to Community Solar: Utility, Private, and Non-Profit Project Development

A resource for community solar project development aimed at community organizers, solar advocates, government officials, and utility managers. Provides information on various community solar project models, state policies that support community solar projects, and tax policies and incentives.

READ MORE

The Office of Indian Energy resource library provides links to helpful resources for Tribes on energy project development and financing in Indian Country. The library includes links to more than 85 topically relevant publications, websites, videos, and more produced by the Office of Indian Energy and external organizations. The resources are specifically focused on energy topics that help promote Indian tribal energy development, efficiency, and use.

Find resources for Tribes on the following topics:

- Community Scale Development
- Fossil Energy
- Legal and Regulatory
- Project Checklists
- Project Development and Finance
- Strategic Energy Planning
- Technology
- Transmission
- Tribal Case Studies
- Utilities

PROJECT DEVELOPMENT AND FINANCE

Education and Training
Energy Resource Library
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Tribal Summit

Below are resources for Tribes on energy project development and finance.

Project Development and Finance Course Curriculum Terminology Guide

This document provides definitions for terminology and acronyms used in the professional course training curriculum developed for Tribes by the DOE Office of Indian Energy, available on the National Training & Education Resource (NTER) website.

PROJECT DEVELOPMENT

A Guide to Community Solar: Utility, Private, and Non-Profit Project Development

A resource for community solar project development aimed at community organizers, solar advocates, government officials, and utility managers. Provides information on various community solar project models (utility-sponsored, special purpose entities, non-profits), state policies that support community solar projects (group billing, virtual net metering, joint ownership), and tax policies and incentives. Source: U.S. Department of Energy.

An Introduction to Geothermal Permitting

This guide tracks the geothermal permitting process through multiple levels, addressing such issues as the importance of where the geothermal resource is located, how the federal government defines geothermal, the kinds of permits needed, how states define geothermal, and which state agencies issue geothermal permits in each state. Source: Liz Battocletti, Bob Lawrence and Associates, Inc.

Federal Loan Programs for Economic and Community Development throughout Indian Country and Alaska

This document provides a list of federal loan programs available to Tribes and includes the agency name, program name, eligibility, maximum loan amount, fees, contact information, and more. Source: U.S. Department of Agriculture.

Guide on How to Develop a Small Hydropower Plant

This guide aims to give potential developers of small hydropower plants comprehensive information and advice on all necessary procedures for developing a site and includes the key steps to be followed to run a plant. Source: The European Small Hydropower Association.

Key Aspects in Developing a Wind Power Project

Provides a brief overview of the different steps involved with developing a wind power project, including site analysis, permitting, electricity, technologies, financial aspects, and installation. Source: Vestas.

Additional DOE Resources

DOE Office of Indian Energy Technical Assistance
www.energy.gov/indianenergy/technical-assistance

EERE Tribal Energy Program Email Updates
http://apps1.eere.energy.gov/tribalenergy/email_signup.cfm

EERE News Updates and Webinars
http://apps1.eere.energy.gov/news/subscribe.cfm

National Training and Education Resource (NTER)
www.nterlearning.org

State & Local Energy Efficiency Action Network (SEE Action)
www.eere.energy.gov/seeaction

Weatherization and Intergovernmental Program
www.eere.energy.gov/wip/

More Helpful Resources

American Council on Renewable Energy (ACORE)
acore.org

Interstate Renewable Energy Council (IREC)
irecusa.org

National Association of Regulatory Utility Commissioners (NARUC)
naruc.org


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